International Journal of Surgery Case Reports 5 (2014) 231–233

International Journal of Surgery Case Reports

journal homepage: www.casereports.com

Pigmented villous nodular synovitis mimicking metastatic melanoma on PET-CT

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ARTICLE INFO

Article history:
Received 29 October 2013
Received in revised form 20 January 2014
Accepted 14 February 2014
Available online 26 February 2014

Keywords:
Metastatic melanoma
Pigmented villous nodular synovitis

ABSTRACT

INTRODUCTION: Positron Emission Tomography – Computed Tomography (PET-CT) is routinely utilized in the management of melanoma, either as a part of staging workup or during surveillance. Since melanomas have a high metastatic potential, any FDG avid lesion is considered suspicious for recurrence. We report a case of a FDG avid lesion, diagnosed during melanoma surveillance, its management and review of literature.
PRESENTATION OF CASE: A 58 year-old-male underwent wide local excision for melanoma of the left cheek, and one year post-operatively a PET-CT that revealed a hypermetabolic focus in his right subscapularis muscle, which upon resection was diagnosed as Pigmented Villonodular Synovitis (PVNS).
DISCUSSION: PVNS is a rare benign giant cell tumor that requires no additional treatment in asymptomatic individuals. PET-CT is used for staging and surveillance of numerous malignancies, including melanoma. A hypermetabolic lesion on a PET-CT scan in the setting of malignancy is always suspicious for recurrence.
CONCLUSION: The surgeon is reminded of a uncommon benign FDG avid lesion. Typical location, non-specific symptoms and characteristic imaging findings help cue in the diagnosis of PVNS and a tissue diagnosis will establish the diagnosis, thus avoiding unnecessarily aggressive surgical management.

1. Introduction

Skin cancer accounts for over 40% of all malignancies diagnosed in the United States, and its incidence is increasing. Overall, melanoma is it is the eighth most common cancer diagnosed in the United States, and although it accounts for only 4–5% of all skin cancer diagnoses it causes the majority of all skin cancer deaths, and with advances in treatment the proportion of melanoma survivors are on a rise. Detection of cancer recurrence with a combination of physical exam and imaging studies is a key component of melanoma surveillance. Although early detection and wide local excision of the primary lesion have resulted in much improved survival rates for patients with melanoma, screening for recurrence is an essential part of any treatment strategy.

PET-CT is often used to stage melanoma patients prior to their initial resection and to follow select patients for recurrence. In this report, we describe a case of Pigmented Villonodular Synovitis (PVNS) which is an FDG avid lesion and was detected on PET CT during routine melanoma surveillance. PVNS is FDG avid on PET-CT and has been known to cause false positive PET-CT reads,[1] yet a review of the literature reveals few published cases of PVNS masquerading as melanoma, none in the surgical literature.[2,3]

2. Presentation of case

A 58-year-old male presented to his primary care physician with a concerning nevus of his left cheek. Punch biopsy revealed a 0.55 mm thick melanoma, for which he received a wide local excision. Final pathology revealed melanoma in situ, thickness 0.55 mm, with negative margins and without any ulceration. He recovered uneventfully from his primary resection. Approximately 1 year after his melanoma resection he received a PET-CT that showed a hypermetabolic focus in his right subscapularis muscle, without corresponding abnormality on the CT component of the exam (Fig. 1).

Although it is not routine practice to obtain surveillance PET-CT scans for early stage melanomas, he was referred to a surgical oncologist to undergo further workup as a result of the PET-CT findings. To further characterize the lesion he underwent an MRI of the right shoulder which revealed a homogenously enhancing nodule measuring 1.4 cm × 0.9 cm × 1.1 cm situated deep to the subscapularis muscle and anterior to the joint capsule, concerning for metastatic melanoma (Fig. 2). Given this concern he was taken to the operating room, where a palpable mass was identified in the corresponding location. The mass was fully resected and pathology revealed PVNS

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http://dx.doi.org/10.1016/j.ijscr.2014.02.009

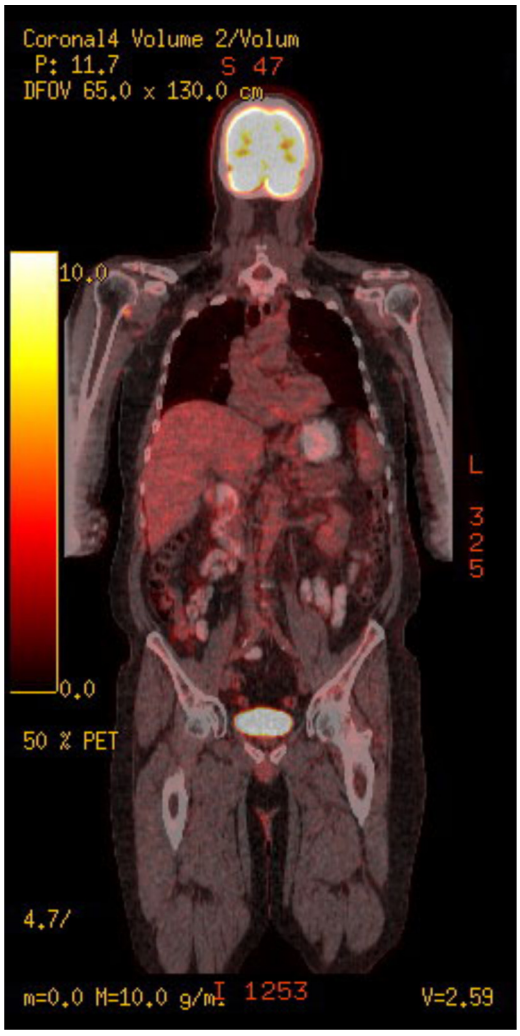

Fig. 1. PET image showing FDG-avid focus in the right subscapularis muscle. The CT component of the image did not reveal any abnormality.

(Fig. 3). The patient is currently 5 years post his initial melanoma diagnosis and remains disease free. Written informed consent was obtained from the patient for publication of this case report and accompanying images.

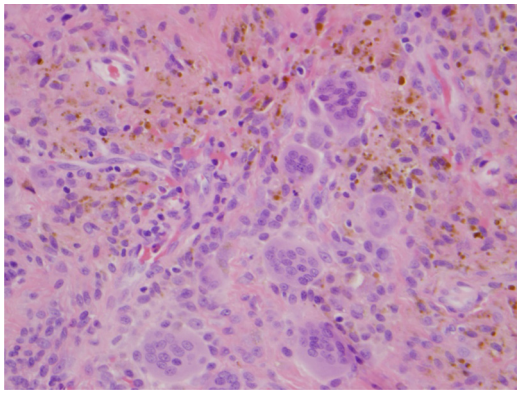

Fig. 3. 40× magnification of PVNS. Histologically PVNS is a papillary villous nodular expansion of the synovial membrane where the surface synovial cells overlie a lobular and sheet-like arrangement of mononuclear rounded and epitheloid cells, multinucleated osteoclast-like giant cells, and lipid-rich cells.

3. Discussion

An extensive literature review revealed only three published cases of PVNS presenting in a patient with a diagnosis of malignant melanoma (Table 1) 1–3. Two of these cases were diagnosed while the patient was undergoing their initial staging workup at the time of their melanoma diagnosis, and in the third, the interval between the melanoma diagnosis and the PVNS diagnosis is not reported. In all reported cases, the location of the primary melanoma, as well as the location of the PVNS, is variable (Table 1). Including our patient, the primary melanomas arose in the cheek, the back, and the perineum, while the PVNS was found in each knee, the acetabulum, and the shoulder. All of these patients underwent surgical procedures to obtain tissue diagnoses on these presumed metastatic lesions, only to find these lesions were benign.

Pigmented Villonodular Synovitis (PVNS) is a rare benign giant cell tumor of the tendon sheath that is usually asymptomatic but can present with pain, swelling, and decreased range of movement in the affected joint. PVNS most commonly presents in young adults with non-specific symptoms of intermittent pain and joint swelling, and when it is diagnosed as a localized lesion excision is curative. Although most common in the knee, PVNS can occur in any joint space, and prior to the widespread clinical use of MRI for joint pain was often diagnosed late.[4] On MRI PVNS appears as an intraarticular nodular mass with low signal intensity on T1 and T2, in contrast to the low T1 and moderately high T2 intensity seen with

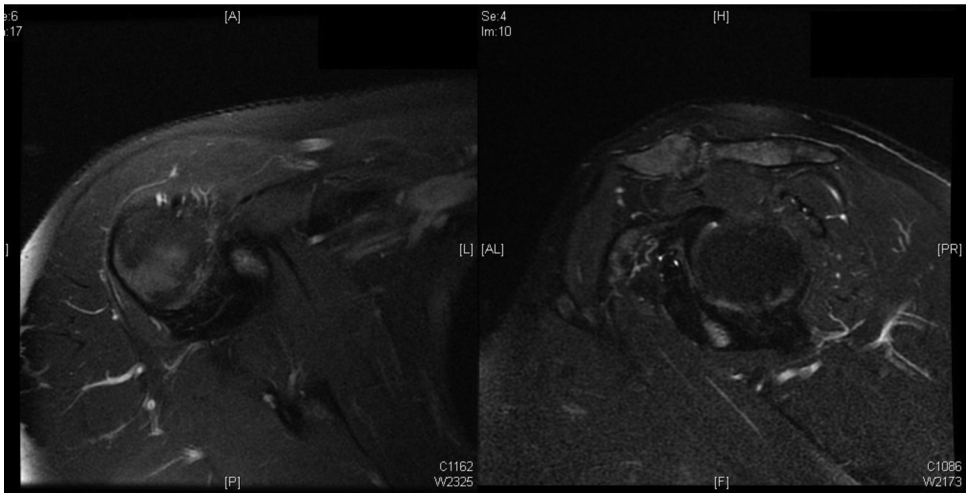

Fig. 2. MRI showing a round hypermetabolic focus in the right subscapularis muscle concerning for metastatic melanoma.

Table 1
Clinical characteristics of patients with PVNS and melanoma reported in literature.

Patient	Age	Primary site	[a]PVNS site	Interval between melanoma and [a]PVNS	Source
1	58 M	L cheek	R shoulder	1 year	
2	47 M	L cheek	R knee	Unknown	Clin Nucl Med 2007[2]
3	51 M	Perineum	L knee	Simultaneous	Ann Diagn Pathol 2003[3]
4	49 F	L back	L acetabulum	Simultaneous	Clin Nucl Med 2003[1]

[a] PVNS: primary villonodular synovitis.

melanoma metastases. As PVNS and metastatic melanoma require vastly different treatment regimens, it is important for the surgeon to consider PVNS as a differential for melanoma especially in cases when PET-CT identifies possible metastatic spread to the joints.

The utility of Positron Emission Tomography – Computed Tomography (PET-CT) to monitor clinically asymptomatic melanoma patients for metastatic recurrence is well described, and any resectable FDG avid lesions that are identified are assumed to require aggressive surgical management. Current NCCN guidelines recommend that patients with Stage IIB or greater melanoma (>2.01 mm thickness) receive routine imaging (chest X-ray, CT, or PET-CT) every 4–12 months to surveil for recurrence; patients with lower stage melanoma do not require routine surveillance in the absence of symptoms suggestive of recurrence.[5] Of course, patients who develop symptoms concerning for metastasis should always be investigated at the discretion of the attending physician.

4. Conclusion

PET-CT is used for staging and surveillance of numerous malignancies, including melanoma. An FDG-avid lesion on a PET-CT scan in the setting of a known malignancy is always suspicious for recurrence and warrants an aggressive workup, but the surgeon is reminded that not all FDG-avid lesions are metastases. In our case the presumed metastasis in the joint was identified as PVNS on final pathology. This uncommon, and benign, FDG-avid lesion requires no additional treatment in asymptomatic individuals, thus avoiding significant morbidity and distress to the patients. Typical location, nonspecific symptoms and characteristic imaging findings help cue in the diagnosis of PVNS and a tissue diagnosis will establish the diagnosis, thus avoiding unnecessarily aggressive surgical management.

Conflict of interest statement

None.

Funding

None.

Ethical approval

None.

Consent

A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contributions

Luke Selby involved in data collection, data analysis and interpretation, writing the manuscript, critical revision and review of the manuscript.

Moshim Kukar involved in study concept and design, data analysis and interpretation, critical revision and review of the manuscript.

John Wang involved in critical revision and review of the manuscript.

Mansoor Beg involved in critical revision and review of the manuscript.

James Sullivan involved in study concept and design, critical revision and review of the manuscript.

Key learning points
FDG-avid lesions in atypical locations for metastases require further workup before metastasectomy.

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